CROCKETT
ENGINEERING CONSULTANTS

STORM WATER CALCULATIONS

FOR

The Village at Discovery Park
Lot 4

PROJECT NO.
230286

July 26, 2024

1000 W. Nifong Blvd. Building 1 • Columbia, MO 65203
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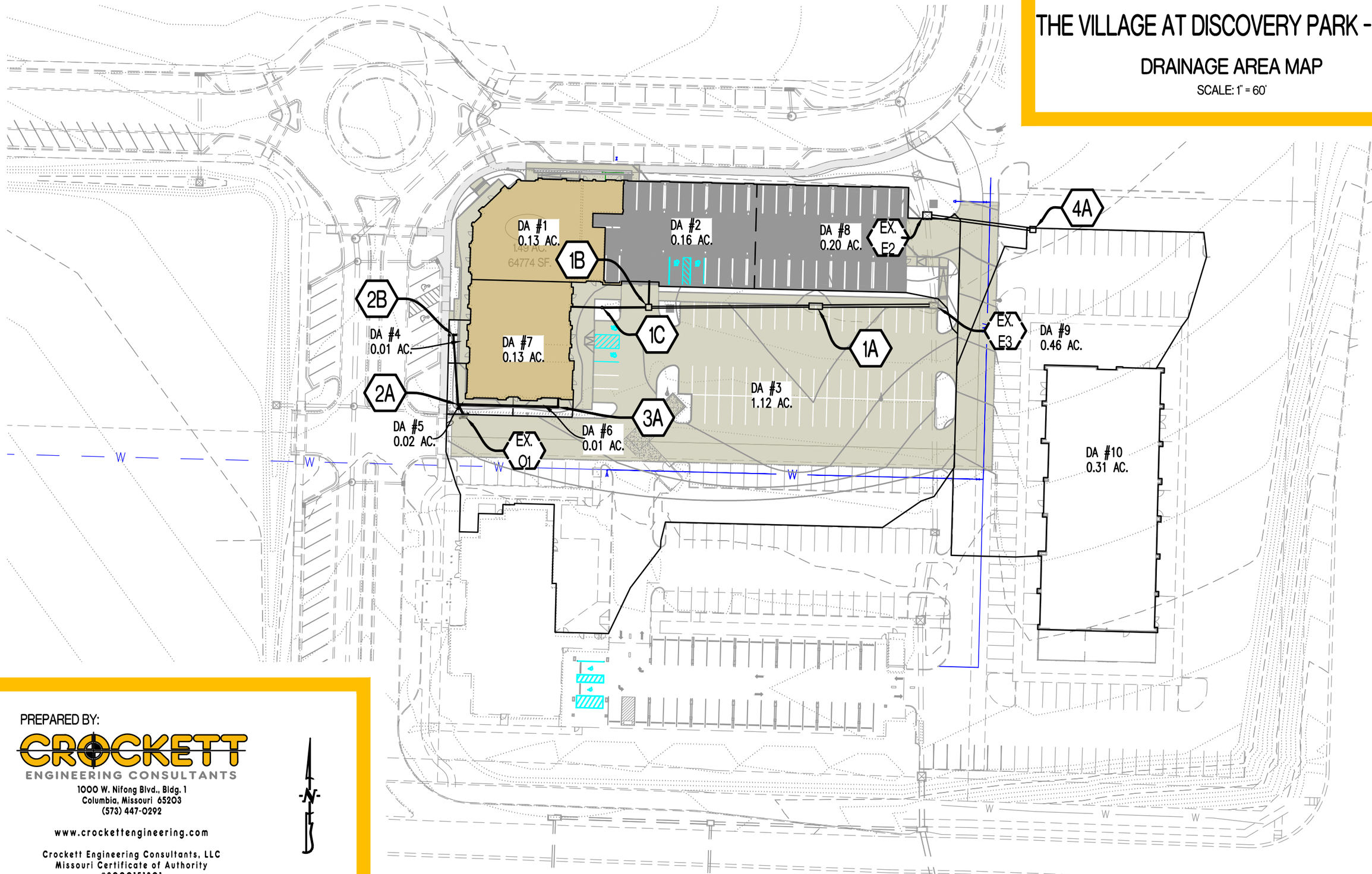
THE VILLAGE AT DISCOVERY PARK - LOT 4

DRAINAGE AREA MAP

SCALE: 1" = 60'



PREPARED BY:

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CALCULATED BY: NMD CHECKED BY: NTE

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STORM HYDROLOGY / GUTTER / INLET CALCLULATIONS

DESCRIPTION			OVERLAND FLOW HYDROLOGY						GUTTER AND INLET HYDRAULICS							NOTES
AREA NO.	STRUCTURE LABEL	INLET TYPE	TIME OF CONCENTRATION	RUNOFF COEFFICIENT	AREA	CA	RAINFALL INTENSITY	RUNOFF	GUTTER FLOW	GUTTER SLOPE	WIDTH OF GUTTER FLOW	DEPTH OF GUTTER FLOW	THEORETICAL INLET CAPACITY	DESIGN INLET CAPACITY	INLET BYPASS FLOW	
			min		acres	acres	in/hr	cfs	cfs	ft/ft	ft	ft	cfs	cfs	cfs	
1	1C	ROOF		0.99	0.13	0.13	10.3	1.33								INTERNAL ROOF DRAIN TO NYLOPLAST
2	1B	ROOF		0.99	0.16	0.16	10.3	1.63								INTERNAL ROOF DRAIN TO JUNCTION BOX
3	1A	A		0.89	1.12	1.00	8.5	8.50					12.75	10.20		DOUBLE TYPE A IN SUMP - BYPASS TO EX. E4
4	2B	DB		0.99	0.01	0.01	10.3	0.10					0.98	0.78		10" END OF LINE DRAIN W/ 04' PONDING (DOMED GRATE)
5	2A	DB		0.99	0.02	0.02	10.3	0.20					0.92	0.74		12" NYLOPLAST DRAIN W/ 0.3' PONDING (PEDESTRIAN GRATE)
6	3B	DB		0.99	0.01	0.01	10.3	0.10					0.92	0.74		12" NYLOPLAST DRAIN W/ 0.3' PONDING (PEDESTRIAN GRATE)
7	3B	ROOF		0.99	0.20	0.20	10.3	2.04								ROOF DRAIN
8	EX. E2	CI		0.89	0.20	0.18	8.5	1.52								EX. 5' X 3' CURB OPENING INLET
	EX. E3	CI														EX. 5' X 3' CURB OPENING INLET
9	4A	A		0.89	0.46	0.41	8.5	3.49					9.80	7.84		TYPE A IN SUMP
10		ROOF		0.99	0.31	0.31	10.3	3.17								FUTURE INTERNAL ROOF DRAIN TO 4A

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STORM DRAIN PIPE SIZE

DESCRIPTION		STORM DRAIN HYDRAULICS										NOTES
AREA NO.	UPSTREAM STRUCTURE LABEL	TIME OF CONCENTRATION	CA		RAINFALL INTENSITY	RUNOFF	STORM DRAIN SLOPE	STORM DRAIN DIAMETER	STORM DRAIN MATERIAL	CAPACITY FLOWING FULL	VELOCITY FLOWING FULL	
			ADDED	CUMUL.					RCP, CMP, PVC OR HDPE			
		min	acres	acres	in/hr	cfs	ft/ft	in		cfs	fps	
LINE 1												
1	1C	<5		0.13	10.32	1.33	0.010	8	PVC	1.43	4.09	
2	1B	<5	0.16	0.29	10.32	2.96	0.010	12	HDPE	3.86	4.91	
3	1A	<5	1.00	1.28	8.53	10.95	0.025	18	HDPE	17.98	10.18	
LINE 2												
4	2B	<5		0.01	10.32	0.10	0.010	6	PVC	0.66	3.38	
5 + LINE 3	2A	<5	0.23	0.24	10.32	2.45	0.010	10	PVC	2.59	4.75	
	EX. O1	<5		0.24	10.32	2.45	0.020	18	HDPE	16.09	9.11	EX. PIPE
LINE 3												
7+6	3B	<5		0.21	10.32	2.15	0.010	10	PVC	2.59	4.75	
LINE 4												
9 + ROOF LOT 1	4A	<5		0.72	8.53	6.11	0.010	18	HDPE	11.37	6.44	

Nyloplast Inlet Capacity Table

DISCLAIMER: SAFETY FACTORS ARE NOT INCLUDED IN THESE CALCULATIONS. ACTUAL CALCULATIONS SHOULD BE CARRIED OUT AND VERIFIED BY THE DESIGN ENGINEER TAKING INTO ACCOUNT ALL LOCAL CONDITIONS. NYLOPLAST RECOMMENDS USING A MINIMUM SAFETY FACTOR OF 1.25 FOR PAVED AREAS AND 2.0 FOR TURF AREAS. ADS/NYLOPLAST IS NOT RESPONSIBLE FOR MISUSE OF THIS TOOL.

Input	
Type of Grate	10" Dome
Head (ft)	0.3

Properties	
Orifice Flow Area (in)	**54.00**
Orifice Flow Area (ft)	**0.37**
Weir Flow Perimeter (in)	**32.30**
Weir Flow Perimeter (ft)	**2.69**

Solution	
Capacity (cfs)	**0.98**
Capacity (gpm)	**440.83**

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33\ Weir\ Discharge\ Coefficient$

$L = Perimeter\ of\ Grate\ Opening\ (ft)$

$H = Flow\ Height\ of\ Water\ Surface\ Above\ Weir\ (ft)$

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60\ Orifice\ Discharge\ Coefficient$

$A = Area\ of\ the\ Orifice\ (ft^2)$

$g = Gravitational\ Constant\ \left(32.2\frac{ft}{s^2}\right)$

$H = Depth\ of\ Water\ Above\ Center\ of\ Orifice\ (ft)$

REV 2.1.21

Nyloplast Inlet Capacity Table

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Input	
Type of Grate	12" Pedestrian
Head (ft)	0.3

Properties	
Orifice Flow Area (in)	**50.60**
Orifice Flow Area (ft)	**0.35**
Weir Flow Perimeter (in)	**43.25**
Weir Flow Perimeter (ft)	**3.60**

Solution	
Capacity (cfs)	**0.92**
Capacity (gpm)	**413.08**

$$Q_{weir} = CLH^{3/2}$$

$C = 3.33\ Weir\ Discharge\ Coefficient$

$L = Perimeter\ of\ Grate\ Opening\ (ft)$

$H = Flow\ Height\ of\ Water\ Surface\ Above\ Weir\ (ft)$

$$Q_{orifice} = CA\sqrt{2gh}$$

$C = 0.60\ Orifice\ Discharge\ Coefficient$

$A = Area\ of\ the\ Orifice\ (ft^2)$

$g = Gravitational\ Constant\ \left(32.2\frac{ft}{s^2}\right)$

$H = Depth\ of\ Water\ Above\ Center\ of\ Orifice\ (ft)$

REV 2.1.21